PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY.

VOL. IV. JANUARY—JUNE, 1846. No. 35.

Stated Meeting, January 2.

Present, twenty members.

Dr. FRANKLIN BACHE, Vice-President, in the Chair.

The report of the election of officers for the ensuing year was read.

President.

N. Chapman, M.D.

Vice-Presidents.

R. M. Patterson, M.D.
Franklin Bache, M.D.
A. D. Bache, LL.D.

Secretaries.

J. K. Kane,
Robley Dunglison, M.D.
A. L. Elwyn, M.D.,
J. F. Frazer.

Counsellors.

Thomas Biddle,
Isaac Lea,
Hartman Kuhn,
T. P. Cope.

Curators.

Franklin Peale,
J. P. Wetherill,
J. C. Cresson.

Treasurer.

George Ord.

Letters were announced and read:—

From Mr. John B. Sartori, dated Leghorn, 1st November, 1845, in reference to the specimen of what he believes to be "fixed mercury," forwarded by him to the Society:—

From Dr. Wm. B. Carpenter, dated London, December 3d, 1845, acknowledging the receipt of the notice of his election as a member of the Society:—

From Sir William Jardine, dated Jardine Hall, 21st November, 1845, acknowledging the notice of his election:—

From Messrs. J. H. Alexander and A. D. Bache, announcing donations to the Society: and,—

From the Zoological Society of London, dated May, 1845, acknowledging the reception of the Proceedings of this Society.

The following donations were announced:—

FOR THE LIBRARY.

Proceedings of the Geological Society of London. Vol. IV. Part III. 1844–5. Nos. 102, 103. 8vo.—*From the Society.*

Proceedings of the Zoological Society of London. Part XII. 1844. 8vo.—*From the Society.*

Reports of the Council and Auditors of the Zoological Society of London, read at the Annual General Meeting, April 29, 1845. 8vo.—*From the same.*

Title and Index to Vol. VI. of the Monthly Notices of the Royal Astronomical Society of London.—*From the Society.*

Catalogo Metodico dei Mammiferi Europei di Carlo L. Principe Bonaparte. Milano, 1845. 4to.—*From the Author.*

Specchio Generale dei Sistemi Erpetologico, Anfibiologico ed Ittiologico di Carlo L. Principe Bonaparte. Milano, 1845. 4to.—*From the same.*

Catologo Metodico dei Ciprinidi d'Europa e Ritievi sul Volume XVII. dell'Istoria Naturale dei Pesci del Sig. Valenciennes di Carlo L. Principe Bonaparte. Milano, 1845. 4to.—*From the same.*

Report on the Standards of Weight and Measure for the State of Maryland; and on the Construction of the Yard Measures. By J. H. Alexander. Baltimore, 1845. 8vo.—*From the Author.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. X. December, 1845. No. 6. 8vo.—*From Dr. Patterson.*

Map of New York Bay and Harbour. Two sheets, which complete the Map, the whole being composed of six sheets.—*From Prof. A. D. Bache.*

Journal of the Senate of the United States of America, being the First Session of the 28th Congress, begun and held in the City of Washington, December 4, 1843, and in the Sixty-eighth Year of the Independence of the United States. Washington, 1843. 8vo. *From the Hon. James Buchanan, Secretary of State.*

Journal of the House of Representatives of the United States. First Session, 28th Congress. Washington, 1844. 8vo.—*From the same.*

Public Documents, printed by order of the Senate of the United States. First Session, 28th Congress. Six Volumes. Washington, 1844. 8vo.—*From the same.*

Executive Documents. First Session, 28th Congress. Six Volumes. Washington, 1843, 1844. 8vo.—*From the same.*

Reports of Committees. First Session, 28th Congress. Three Volumes. Washington, 1843, 1844. 8vo.—*From the same.*

ADDITION TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten. No. 549, with Supplementary Number. 4to.

Prof. Frazer, on the part of the Committee on Major Graham's paper, reported progress.

Mr. Daniel B. Smith read a portion of a letter from Prof. Henry, of Princeton, that referred to a paper by Mr. Faraday, relating to a new discovery in regard to the polarization of light, and stating that he had repeated with success the experiments of Mr. Faraday.

Stated Meeting, January 16.

Present, twenty-six members.

Dr. CHAPMAN, President, in the Chair.

Letters were received and read:—

From the Perpetual Secretary of the First Class of the Royal Institute of the Netherlands, Amsterdam, dated July

25, 1845, informing the Society that Vol. XI. of the New Memoirs of the Institute was forwarded, and acknowledging the reception of the Proceedings of this Society, and of Dr. Dunglison's Eulogy on its late President, P. S. Du Ponceau, Esq:—

From Col. Totten, dated Washington, Jan. 8th, 1846, announcing a donation to the Library:—

From Professor Frazer, resigning the office of Secretary: and,—

From the Secretary of the Society for the Encouragement of Arts, dated London, 17th June, 1845, acknowledging the reception of the Proceedings of this Society, and of Dr. Dunglison's Eulogy on P. S. Du Ponceau, Esq.

The following donations were announced:—

FOR THE LIBRARY.

Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Zweiter Band. Von den Jahren, 1842—1844. Göttingen, 1845. 4to.—*From the Royal Society of Göttingen.*

Nieuwe Verhandelingen der Eerste Klasse van het Koninklijk-Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone Kunsten te Amsterdam. Elfde Deel. (Vol. XI.) Amsterdam, 1845. 4to.—*From the Netherlands Institute.*

Het Instituut, of Verslagen en Mededeelingen, uitgegeven door de Vier Klassen van het Koninklijk Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone Kunsten, over den Jare, 1844. Nos. 3 and 4. 1845. No. 1. 8vo.—*From the same.*

The African Repository and Colonial Journal. Vol. XXII. January, 1846. No. 1. 8vo.—*From the American Colonization Society.*

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D. No. XXI. New Series. Jan. 1846. 8vo.—*From the Editor.*

The Medical News and Library. Jan. 1846. No. 37. 8vo.—*From Messrs. Lea & Blanchard.*

An Introductory Lecture, delivered before the Class of Institutes of Medicine, in Jefferson Medical College, November 3, 1845. By Robley Dunglison, M.D. 8vo.—*From the Author.*

The American Journal of Science and Arts. Conducted by Prof.

Silliman, B. Silliman, Jr., and James D. Dana. Second Series. Vol. I. January, 1846. No. 1. 8vo.—*From the Editors.*

Annual Message of the Governor of Pennsylvania, transmitted to the Senate and House of Representatives, Jan. 7, 1846. 8vo.—*From C. B. Trego, Esq.*

Twenty-ninth Congress, First Session, House of Representatives, Document No. 2. Message of the President of the United States, to the Two Houses of Congress, Dec. 2, 1845. 8vo.—*From the Hon. Joseph R. Ingersoll.*

Twenty-ninth Congress, First Session, Senate, Document No. 13. Report from the Secretary of the Treasury, communicating a Report from the Superintendent of the Coast Survey, showing the Progress of the Work under his charge during the year ending November, 1845. 8vo.—*From Prof. A. D. Bache.*

The Committee on Major Graham's paper, on the Dip of the Magnetic Needle in 1842, 1843, 1844, reported in favour of its publication in the Transactions of the Society, and it was so ordered.

Dr. Patterson alluded to the letter of Prof. Henry, read at the last meeting, and read a portion of a second letter from the same gentleman, in which he describes the manner in which he had repeated the experiments of Mr. Faraday.

This consists in producing, in pure water and other liquids, a new arrangement of particles, by which they become possessed of the property of circular polarization, during the time a current of galvanism is circulating around them. The arrangement I employed was as follows:—A tube of glass was filled with pure water, and the ends closed with plates of glass; this was placed in the axis of an iron tube, and this again inserted into the axis of a coil consisting of about eight hundred feet of copper wire. The ends of the iron tube were closed with corks, through one of which was passed a Nicoll's prism, and in the axis of the other was fastened a plate of tourmaline. This tube being directed to the clear sky, and the tourmaline, which was placed next the eye, so turned that it presented a dark field of view, a current of galvanism from twenty-two cups of Daniell's battery was passed through the coil. At the moment of making the communication with the battery, the field became light; and when the circuit was broken, it again appeared dark. A slight rotation of the tourmaline also produced darkness while the galvanic

current was passing, which indicated a twist in the plane of polarization of the prolonged beam. The same effect was produced without the iron tube, but not to the same extent.

Dr. Boyé communicated to the Society the results of an Analysis of a Concretion from a Horse's Stomach, performed by Mr. Charles M. Wetherill and himself.

This concretion, for a fuller description of which, in connexion with its history, Dr. B. referred to his friend, Dr. B. H. Coates, by whom it was handed to him for examination, is remarkable for its size, weighing $11\frac{3}{4}$ lbs. It is of an oval shape, smooth surface, brownish-grey colour, and breaks in concentric layers of different degrees of thickness, exhibiting a fibrous or radiated structure. The outer layer alone was analyzed. The concretion was found, by Dr. Coates, to contain a nail in its centre.

By a qualitative examination, it was found to consist of phosphoric acid, magnesia, ammonia, chemically combined water, a small portion of organic matter, and silex. It contained no lime. In order to determine quantatively these ingredients, a portion was dissolved in dilute hydrochloric acid; the insoluble residue collected on a counterpoised filter, dried and weighed; after incineration and weighing, it yielded ***insoluble inorganic matter*** 0.45 ***per cent.***, which, deducted from its former weight, gives ***insoluble organic matter*** 0.64 ***per cent.***

To the filtered solution was added a weighed portion of iron wire, dissolved in nitro-muriatic acid, and the whole then precipitated by ammonia. Having previously ascertained the amount of peroxide of iron yielded by an equal portion of the same iron wire, the difference in weight of these two precipitates gave for the ***phosphoric acid***, 32.40 ***per cent.***

To the filtered solution from the phosphoric acid, was added caustic potash in excess, and the whole boiled until the ammoniacal vapours were effectually expelled, and the solution gave a strong alkaline reaction. The magnesia thus obtained was collected upon a filter, washed with boiling water, incinerated and weighed; it yielded ***magnesia***, 14.45 ***per cent.***

Another portion of the powdered concretion dried over sulphuric acid in vacuo at ordinary temperatures, yielded ***hygrometric moisture***, 1 ***per cent.;*** incinerated, it yielded ***volatile matter*** (***water and ammonia***), 51.70 ***per cent.***

In order to determine the amount of ammonia, another portion of the powder was introduced into a small tubulated retort, with carbonate of soda and water. The neck of the retort was adapted to a small tubulated receiver containing dilute hydrochloric acid, and having adapted to its tubulure a nitrogen bulb, such as is used in ultimate organic analysis; this also contained dilute hydrochloric acid. The mixture in the retort was evaporated to dryness; and at the close of the operation, air was drawn through the apparatus to insure the absorption of the last portion of ammonia. The *ammonia* thus obtained was estimated by precipitation by chloride of platinum, as in organic analysis, and yielded 0.71 per cent.

Hence the composition of the concretion is as follows:—

Phosphoric acid, - - -	32.40	per cent.
Magnesia, - - -	14.45	„
Water, - - - -	50.35	„
Ammonia, - - -	.71	„
Insoluble inorganic matter, -	.45	„
Insoluble organic matter, - -	.64	„
Hygroscopic moisture, - -	1.00	„
	100.00	

It will be seen from this, that the amount of ammonia is too small to be considered an essential ingredient of the concretion. Assuming it to exist in the state of double phosphate of ammonia and magnesia with water (NH^4O, $2MgO$, $PO^5 + 2HO + 10HO$), and deducting the amount of this salt from the rest (omitting the insoluble matter and hygroscopic moisture), it will be seen that the concretion is composed mainly of the phosphate of magnesia and water, according to the following formula $3MgO + 3HO + 2PO^5 + 21$ aqua, as will be seen from the following comparison:—

By Experiment.		By Calculation.	
Phos. acid,	33.56	$2PO^5$,	33.70
Magnesia,	14.55	$3MgO$,	15.20
Water,	51.89	24Aq.	51.10
	100.00		100.00

Dr. Coates mentioned some of the symptoms which attended the formation of this concretion, and that it had not been re-

marked as producing inconvenience to the animal, till a week before its death. Dr. Coates supposed it was found in the cœcum, and not in the stomach. This inference was drawn partly from the authority of Berzelius in cases of similar concretions, and partly from anatomical and physiological considerations. Dr. Coates mentioned also, that he had found the tricocephalus in the human cœcum after death.

The list of the surviving members of the Society was read; from which it appears, that the whole number is 353. Two hundred and forty-six reside in the United States, and one hundred and seven in foreign countries. Ten deaths have been announced to the Society during the year.

Mr. George Ord was reëlected Librarian.

The following standing Committees were appointed:

Of Finance.—Mr. C. C. Biddle, Dr. Patterson, Mr. Lea.

Of Publication.—Mr. Lea, Dr. Hays, Mr. J. F. Fisher.

On the Hall.—Mr. Campbell, Mr. Fraley, Mr. Kane.

On the Library.—Dr. Hays, Mr. Campbell, Mr. Penington.

The Society then proceeded to ballot for new members.

The Committee appointed to take charge of the claim of the Executors of the late Nathan Dunn, against the Society, made a verbal report, and requested to be discharged, to which the Society consented.

The business of the evening being concluded, the ballot boxes were opened, and the following gentlemen declared by the presiding officer to be elected members of the Society:

Henry Holland, M.D. F.R.S., of London.

Professor John Muller, of Berlin.

Hon. James Buchanan, of Lancaster, Pa.

Stated Meeting, February 6.

Present, thirty-five members.

Dr. CHAPMAN, President, in the Chair.

Letters were received and read:—

From the Academy of Arts and Sciences, Boston, dated January 31, 1846, enclosing a report of a Committee of the Academy, calling the attention of this Society to the subject of Meteorological Observations in North America, and suggesting some alterations and improvements in the present system:—

From the Imperial Society of Naturalists of Moscow, dated Sept. 11, 1845, announcing the transmission of some numbers of the Bulletin of that Society:—

From the Society of Natural History in the Mauritius: and,

From Baron Von Hammer Purgstall, dated Vienna, Feb. 8, 1845, informing the Society that he had sent to it, as a donation, a set of the Vienna Review, for 1844, and another work.

The following donations were announced:—

FOR THE LIBRARY.

Bulletin de la Société Impériale des Naturalistes de Moscou. Tome XVIII. Année 1845. Nos. 2 and 3. Moscou, 1845. 8vo.—*From the Society.*

Annual Report of the Trustees of the State Library. Albany, Jan. 9, 1846. 8vo.—*From the Trustees.*

Jahrbûcher der Literatur. January to December, 1844. Vienna. 8vo.—*From Baron Von Hammer Purgstall.*

Zeitwarte des Gebeles in Sieben Tageszeiten. Ein Gebetbuch, Arabisch und Deutsch. Herausgegeben von Hammer Purgstall. Wein, 1844. 12mo.—*From the Author.*

The Medical News and Library. Vol. IV. Feb. 1846. No. 38. 8vo.—*From Messrs. Lea & Blanchard.*

Address delivered at the University of Pennsylvania, before the Philomathean Society, May 23d, 1845. By Henry D. Gilpin. 8vo. *From the Author.*

ADDITION TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten. No. 550, and Supplement. 4to.

Mr. Nulty read a paper "On the Determination of Azimuths in a Geodesical Survey, from a Series of Observations of Polaris."

This star, when towards its maximum elongation from the meridian of a station, has been found to give more consistent and uniform results than observations of the *sun*, and should therefore be exclusively preferred at all geodesical stations, which require a high degree of accuracy in their respective bearings. The principal data employed in the computation of an azimuth, chiefly depend on the instrument used by the observer. With the repeating circle, a number of angular distances forming a series may be taken vertically, between the star, near its greatest eastern or western elongation, and a corresponding signal placed in the horizon; or a like series of horizontal angles may be observed by means of a theodolite. Both modes of observation will lead to accurate results; but when the star is viewed successively near its greatest eastern and also near its greatest western elongation from the meridian of the station, so as to guard against imperfection in the instrument, the latter is preferred as having superior advantages. This mode of observing Polaris has been lately adopted in the U. S. Coast Survey, by its present superintendent. It must give to the azimuthal bearings of that extensive work every requisite precision. The brief notice here taken will enable the mathematician to form a sufficient idea of the problem of azimuths by Polaris, as considered by the author of the paper now under report. The several instants of observation with the elongations of the star, and the known latitude of the station, are the essential elements of solution; but, instead of introducing them into the usual general expressions for azimuths, which in case of one or several series would be attended with excessive labour, the author employs special formulæ immediately bearing on the observed positions of the star, and by which the practical computation of azimuths by Polaris, is reduced to almost the same facility as that of latitude. It is hardly necessary, in a summary of this nature, to describe minutely the character of the formulæ investigated in the paper. They correspond in general to three positions of Polaris, taken as an origin or mean instant of a series; the *first* being the time of maximum elongation, the *second* involving a horary angle of six hours from the meridional passages at the station, and the third referring to a more general position of the star, not, however, far distant from its plane at greatest elongation. In a mathematical sense, they have each

some analytical advantage; and an expert computer will use them and their adjunct differential expression with equal facility in reference to the mean instant of his data. The author appears to have had considerable experience in testing their practical application, and from such, gives a partiality to his leading formulæ, as connected with the more favourable position of the star, and as having brevity and easy recollection to recommend them. In concluding his paper, he mentions "Puissant Geodesie," (edition of 1842,) and Strune's Gradmessing, as standard writers in France and Germany, on these and similar subjects. He regretted not having the advantage of seeing these works, and referred to them only through a notice of Prof. A. D. Bache, Superintendent of the Coast Survey, who has sent to him a short transcript of two formulæ (one from each work), which are different from those forming the principal objects of his paper, and which must be seen in their respective authors, to seize their application and their presumed advantage.

Professor J. C. Cresson gave a brief account of the demolition of Mr. Paul Beck's shot tower, in the western part of the city. The height of the structure was about 160 feet, and the walls six feet in thickness at the base.

The walls were cut away near the base on the whole of the northern side, and partly on the eastern and western, the parts thus undermined being temporarily supported by shores of timber. When the undermining was completed, an unsuccessful attempt was made to remove the shores by means of gunpowder; and while the workmen were preparing a second charge of powder, the base of the building was suddenly protruded toward the south, and the whole fabric crumbled into fragments, collapsing, as it were, upon its own base, and the ruins occupying but little more ground area than the original structure.

The following communication, relating to observations made at the Washington and Philadelphia High School Observatories, on the two Biela comets, was brought before the Society, by Dr. Patterson.

Washington, D. C. Feb. 5, 1846.

Dear Sir,—I send you the measures of the position and distance of the two Biela comets, made at the Washington and High School Observatories. The angles of position are measured from the north round the circle eastward. The time is mean time, Washington Observatory. The results are as yet only approximate, not having been rigorously computed.

DATE.				Observatory.	Position B from A.	Distances.	Brilliancy of B in parts of A.
January	14*d*	6*h*	51*m*	Wash.	322.4°	98.″	0.2
	18	6	46	„	325.0	130.	0.3
	19	6	38	„	325.5	131.	0.3
	22	7	1	„	325.8	145.	0.4
	22	7	45	Phila.	330.0	145.	0.4
	23	7	1	Wash.	327.8	147.	0.4
	24	7	23	„	326.4	152.	0.5
	24	7	27	Phila.	329.1	152.	0.5
	26	6	35	Wash.	327.7	156.	0.6
	28	6	47	„	330.0	169.	0.7
	28	6	27	Phila.	329.6	178.	0.7
February	4	6	39	Wash.	333.5	221.	0.7

B is the fainter comet. Both A and B have a condensation of light in the centre of their nebulosities. Both have a tail extending from the comet opposite the sun about 4′. Both the nebulosities when the moonlight is absent, seem to blend very faintly at their outer border.

The above descriptions and measures are furnished with the consent of Messrs. Maury and Kendall.

I submit, with some hesitation, an opinion respecting these singular objects.

In a period of 21 days of observation, the difference in place of each from that of Santuri's Ephemeris of the Biela comet is quite uniform, in traversing an arc of 15° of apparent motion in the heavens. Hence they would seem to be components of Biela's comet.

The objects are so indefinite in their shape that you will notice a great discrepancy in the measured positions and distances. By taking an average of several consecutive evenings, except for the 4th of February, which depends on one night's work, I find the following results:—

	B from A Position.	Daily increase.	B from A Distance.	Daily increase.	Log. dist. comet from earth	B from A in parts of earth's mean distance foreshortened.	Daily increase.
Jan. 18.*d*79	325°.2		130″		9.8783	0.0004762	
23.*d*28	327°.8	+0°.58	148″	+4″.0	9.8634	0.0005238	+0.0000106
28.*d*28	329°.8	+0°.40	174″	+5″.3	2.8346	0.0005764	+0.0000105
Feb. 4.*d*28	333°.5	+0°.53	211″	+5″.3	9.8082	0.0006578	+0.0000116

From these data it would seem that the apparent secondary revolution of B round the common centre of gravity of B and A is at the rate of about one half a degree per day, and the foreshortened daily departure of B from A in space, is about 1000 miles, and that so far, the revolution round each other, and the increase of distance asunder, are nearly uniform.

I am quite unable to give any theoretical explanation of the phenomenon.

Yours, truly,

S. C. WALKER.

To Prof. A. D. Bache, LL.D.

Prof. A. D. Bache made some remarks on the progress of the coast survey, under his superintendence, and illustrated them by a number of diagrams.

On motion of Dr. Elwyn, the letter from the American Academy of Arts and Sciences was referred to a committee, consisting of Dr. Emerson, Mr. Charles M'Ewen, and Prof. Cresson.

Stated Meeting, February 20.

Present, seventeen members.

Dr. Chapman, President, in the Chair.

A letter was announced and read:—

From the American Academy of Arts and Sciences, dated Boston, Feb. 8, 1846, inviting the coöperation of the American Philosophical Society, in a petition to Congress, to print an additional number of copies of the Reports of the U. S. Exploring Expedition.

The communication was referred to a Committee, consisting of Dr. Elwyn, Prof. Frazer, and Dr. Patterson.

The following donations were announced:—

FOR THE LIBRARY.

Proceedings of the Geological Society of London. With Plates in illustration of the Papers abstracted. Session 1844—45. Vol. IV. No. 104. Part 3. 8vo.—*From the Society.*

Proceedings of the London Electrical Society. Sessions of 1842–3. Edited by the Secretary. London, July 1, 1842. 8vo.—*From the Society.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. II. No. 12. Nov. Dec. 1845. 8vo.—*From the Academy.*

The Electrical Magazine. Conducted by Mr. Charles V. Walker. Vol. I. No. 2. October, 1843. 8vo.—*From the Editor.*

Journal of the Franklin Institute of the State of Pennsylvania. Third Series. Vol. XI. January, 1846. No. 1. 8vo.—*From Dr. Patterson.*

The African Repository and Colonial Journal. Vol. XXII. February, 1846. No. 2. 8vo—*From the American Colonization Society.*

The British Almanac of the Society for the Diffusion of Useful Knowledge. For the Year 1846. 12mo.—*From Petty Vaughan, Esq.*

Notes on the Iroquois; or Contributions to the Statistics, Aboriginal History, Antiquities and General Ethnology of Western New York. By Henry D. Schoolcraft. New York, 1846. 8vo.—*From the Author.*

A Brief Account of the Processes employed in the Assay of Gold and Silver Coins, at the Mint of the United States. 8vo.—*From Dr. Robert M. Patterson.*

Act of January 18, 1837, relative to the Mint and Coinage of the United States. 8vo.—*From the same.*

The Committee appointed at the last meeting to report upon the communication from the Academy of Arts and Sciences, offered the following resolutions.

Resolved, That the American Philosophical Society adopt the recommendation of the American Academy of Arts and Sciences to unite with them in a memorial to the Government, asking an extension of meteorological observations to remote military posts, to some of the posts and lighthouses on our coasts, and to certain other points to be designated in the memorial.

Resolved, That the Franklin Institute of Pennsylvania be invited to join in said memorial, and in a circular to the Legislatures of the States, and to individuals.

Dr. Boyé exhibited to the Society a specimen of Brown Hematite Ore from Chester Ridge, three-fourths of a mile west of

Chester Furnace, Huntingdon County, Pa., containing a small quantity of *Oxide of Cobalt*,—the surface of the ore is in some places covered with a thin film of oxide of cobalt. It also contains a moderate proportion of manganese.

The ore was dissolved in chlorohydric acid, the solution neutralized by ammonia, and then the iron precipitated by boiling, after previous dilution with water. The oxide of cobalt which remained in the solution with the manganese, was discovered both by its reaction in the moist way, and by the blue bead it yielded with salt of phosphorus.

Dr. B. also stated that by a visit to Colemanville Iron Works, Lancaster County, Pa., he had found on the outer surface of the coal-pits for charring wood, a yellowish white deposition.

On examining this deposition it was found to consist of acetate of lime. By dissolving it in water and treating it with animal charcoal, the acetate of lime was obtained perfectly colourless. Dr. Boyé remarked, that the lime was probably derived from the soil, but as acetate of lime was not volatile, it must be carried up mechanically by the vapours of pyroligneous acid and other volatile substances, given off by the process of charring.

Mr. Haldeman called the attention of the Society to the apparent projection of a planet on the disk of the moon, while observing occultations. This appearance he ascribed to a state of tension of the retina, which preserved the impression of the object after the eye was removed from it. Further remarks were made on the subject by Prof. Frazer, Drs. Dunglison, Patterson, Coates, Bache, and Mr. G. W. Smith.

Dr. Coates observed, that though he had not been able to verify all the laws of ocular spectra described by Charles Darwin, a circumstance which inclined him to the opinion that these phenomena were materially modified in different individuals, he had observed the sudden disappearance of spectra. Spectra did not decline indefinitely, or till the death of the individual experiencing them, by the law of an infinite series; they terminated abruptly. Our eyes were not constructed with mathematical exactness, nor capable of indefinite minuteness; resembling, in this respect, those of many insects in which a great number of facets replaced the surface of a sphere. Various irregular, nervous sounds, produced in the ear, also termi-

nated abruptly. There appeared to take place in the nervous expansions of the organs of sense, a process resembling that of *attention*, as exhibited in the operations of the brain; and this was frequently the cause why our perceptions were at one time so much keener than at others.

Dr. Patterson exhibited to the Society a second diamond from Hall County, Georgia, nearly three carats in weight, and considered to be of the first water. Mr. Peale stated that he had a specimen of granular quartz, supposed to be the gang of the diamond, that was decidedly flexible.

Stated Meeting, March 6.

Present, sixteen members.

Dr. PATTERSON, Vice-President, in the Chair.

A letter was read from the New York Historical Society, dated New York, February 26, 1846, in relation to the printing, by Congress, of only one hundred copies of the Memoirs on Subjects of Science, prepared by gentlemen of the United States Exploring Expedition, and it was referred to the Committee appointed on the same subject at the last meeting.

The following donations were announced:—

FOR THE LIBRARY.

Journal of the Franklin Institute of the State of Pennsylvania. Third Series. Vol. XI. Feb. 1846. No. 2. 8vo.—*From Dr. Patterson.*

The Medical News and Library. Vol. IV. March, 1846. No. 39. 8vo.—*From Messrs. Lea & Blanchard.*

Annual Report of the Directors and Physicians of the Kentucky Lunatic Asylum to the Legislature. December Session, 1845. Frankfort, Ky. 1846. 8vo.—*From the Kentucky Historical Society.*

Report from the Secretary of the Treasury, communicating a Report of the Superintendent of the Coast Survey, showing the progress

of the Work under his charge, during the year ending November, 1845. 8vo.—*From Prof. A. D. Bache.*

Eighth Geological Report to the Twenty-sixth General Assembly of the State of Tennessee, made November 1st, 1845. By G. Troost, M.D.—*From the Author.*

The Oregon Question. By Albert Gallatin. New York, 1846. 8vo.—*From the New York Historical Society.*

ADDITION TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten. No. 551. 4to.

The Committee, consisting of Mr. A. D. Bache, Dr. R. M. Patterson, and Mr. T. M'Ewen, on the paper of Mr. Nulty, entitled, "On the Determination of Azimuths by the Star Polaris," reported in favour of publication, which was accordingly ordered.

Dr. Bache informed the Society of the death, on the 4th of March, of Mr. Joseph Reed, aged 73.

Mr. Peale offered, for the examination of members, a specimen of the flexible granular quartz referred to at the last meeting.

Prof. Kendall read a letter from Prof. Stephen Alexander, suggesting for consideration the following hypothesis, to account for the peculiarities in the appearance of Von Biela's comet. It supposes a partial change to have taken place similar to that which, according to Sir John Herschell, would seem to have been experienced by Halley's comet about the time of its perihelion passage in 1835.

The central portion of Von Biela's comet has been transformed into invisible vapour, and the portion designated by Lieut. Maury as "Biela," seems to be more sensitive to such a change than "No. 2." The progress of this change would seem to account for—

1st. The apparent rupture of the comet.

2d. The seeming recess of the two portions, as observed by Mr. Walker.

3d. The comparative decay of "Biela" observed by Lieut. Maury.

4th. The comparative increase of the same since the perihelion passage, observed by the same astronomer.

5th. The light arch of cometary matter mentioned in Lieut. Maury's account of his observation, Feb. 19th.

6th. If the hypothesis is true, the two portions will probably soon appear to be reunited.

Prof. Kendall also stated some of the results of his own observations, which agree with those above referred to. He had observed the comet "Biela" on the previous evening, but could find no trace of "No. 2," though perhaps it might have been seen under more favourable atmospheric circumstances.

Prof. Kendall referred to a new comet, discovered at Cambridge, Mass., and which had also been seen at Washington.

Stated Meeting, March 20.

Present, twenty-eight members.

Dr. CHAPMAN, President, in the Chair.

A letter was received and read:—

From Mr. John Cook, informing the Society of a donation to its Library, from Prof. Schröder of Upsala, Sweden,

The following donations were announced:—

FOR THE LIBRARY.

Mémoires de l'Académie Impériale des Sciences de Saint-Pétersbourg. VIme. Série. Sciences Mathématiques, Physiques et Naturelles. Tome Sixième. Seconde Partie: Sciences Naturelles. Tome quatrième, 6me. livraison. Saint-Pétersbourg, 1845. 4to.—*From the Imperial Academy of St. Pétersbourg.*

Mémoires de l'Académie Impériale des Sciences de Saint-Pétersbourg. VIme. Série. Sciences Politiques, Histoire, Philologie. Tome cinquième. 5me. et 6me. livraison. Saint-Pétersbourg, 1845. 4to.—*From the same.*

Mémoires présentés à l'Académie Impériale des Sciences de Saint-Pétersbourg. Par divers Savans, et lus dans ses Assemblées. Tome quatrième. 6me. livraison. Saint-Pétersbourg. 1845. 4to.—*From the same.*

Recueil des Actes de la Séance Publique de l'Académie Impériale des Sciences de Saint-Pétersbourg, tenue le 29 Décembre, 1844.

Avec les Portraits de Ph. Krug et de C. B. Trinius. Saint-Pétersbourg, 1845. 4to.—*From the same.*

The Transactions of the Linnean Society of London. Vol. XIX. Part the Fourth. London, 1845. 4to.—*From the Society.*

List of the Linnean Society of London. 1845. 4to.—*From the same.*

Proceedings of the Linnean Society of London. Nos. XXIII, XXIV, and XXV. 8vo.—*From the same.*

Monthly Notices of the Royal Astronomical Society. Vol. VII. Nos. 1 and 2. Nov. 14, Dec. 12, 1845. 8vo.—*From the Society.*

The Journal of the Royal Geographical Society of London. Vol. XV. Part 2. 1845. 8vo.—*From the Society.*

Twenty-fifth Report of the Council of the Leeds Philosophical and Literary Society, at the close of the Session, 1844–45. Leeds, 1845. 8vo.—*From the Society.*

The African Repository and Colonial Journal. Vol. XXII. March, 1846. No. 3. 8vo.—*From the American Colonization Society.*

The American Journal of Science and Arts. Conducted by Professor Silliman, B. Silliman, jun., and James D. Dana. Second Series. No. 2. March, 1846. 8vo.—*From the Editors.*

The Electrical Magazine. Conducted by Mr. Charles V. Walker. Vol. II. No. 2. January, 1846. 8vo.—*From the Editor.*

The Constitution of Matter, and Laws of Motion, as deducible from, and explanatory of, the Physical Phenomena of Nature. By J. L. Riddell, M.D. From the New Orleans Journal of Medicine. *From the Author.*

Twenty-ninth Congress, 1st Session. House of Representatives, War Department, Document, No. 95. Pension Laws now in force.—*From the Hon. Joseph R. Ingersoll.*

Twenty-seventh Annual Report of the Controllers of the Public Schools of the City and County of Philadelphia, for the Year ending June 30, 1845.—*From Prof. John S. Hart.*

A Tabular Statement relating to the Tax on Real and Personal Estate for State purposes, the Revenue arising from that and other Sources, and to the Payments to Common Schools, for the Periods therein named.—*From Charles B. Trego, Esq.*

A Memoir of James De Veaux, of Charleston, S. C. By Robert W. Gibbes, M.D. Columbia, S. C. 1846. 8vo.—*From the Author.*

The report of the Committee upon the communication from

the Academy of Arts and Sciences of Boston, was read, and on motion of Dr. Patterson, was referred back to the Committee for action.

Mr. Lea called the attention of the Society to a fine specimen of Flexible Quartz, (Quartz hyalin granulaire, Haüy,) from Spartenberg District, S. C., obtained by Dr. Gibbs from that locality.

The specimen was twelve inches long, and about the eighth of an inch thick, curving by a gentle force into an arc, the versed sign of which measured full one inch. Specimens of considerable length of this singularly constructed mineral, are obtained at this locality.

Mr. Justice stated he had in his possession a specimen of the same kind, from Stokes County, North Carolina, about eight inches long and three-fourths of an inch thick, which exhibited the property of flexibility in a remarkable degree, notwithstanding its thickness. He remarked, it was supposed the flexibility arose from the particles of quartz, which pervaded the mass, being of an imbricated or flattened form, and thus overlapping each other, instead of being granular, as in other sandstones.

Prof. Frazer laid on the table, the number of the Bulletin for December, 1845.

On motion of the same gentleman, it was resolved, that the Finance Committee lay before the Society at the next meeting, a statement of its assets and liabilities.

Special Meeting, April 1.

Present, thirty-four members.

Dr. Chapman, President, in the Chair.

The President stated that he had called a special meeting at the request of the Committee appointed at the last meeting, on the subject of the debt due to the late Nathan Dunn.

Stated Meeting, April 3.

Present, thirty-four members.

Dr. CHAPMAN, President, in the Chair.

Letters were received and read:—

From the Society of Antiquaries of London, dated Feb. 20, 1846, acknowledging the receipt of Vol. XI. Part 2, of the Transactions, and of Nos. 32, 33, of the Proceedings of the Society:—and,

From Mr. Townsend Ward, dated Philadelphia, April 3, 1846, requesting the use of a portrait of Heckewelder, belonging to the Society, for the purpose of making a lithographic copy.

On motion of Mr. Ord, permission was given to Mr. Ward.

The following donations were announced:—

FOR THE LIBRARY.

Philosophical Transactions of the Royal Society of London. For the Year 1845. Part II. London, 1845. 4to.—*From the Royal Society.*

List of the Royal Society of London, 30th Nov. 1845. 4to.—*From the same.*

Proceedings of the Royal Society of London. No. 61. 8vo.—*From the same.*

Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the Year 1843, under the direction of George Biddell Airy, Esq., M.A., Astronomer Royal. Published by order of the Board of Admiralty, in obedience to Her Majesty's command. London, 1845. 4to.—*From the Royal Society.*

Annales des Mines. Redigées par les Ingénieurs des Mines. Quatrième Série. Tome VII. 2e Livraison de 1845. 8vo.—*From the Engineers of Mines at Paris.*

Journal Asiatique. Quatrième Série. Tome VI. No. 27. Septembre, Octobre, 1845. 8vo.—*From the Asiatic Society of Paris.*

Proceedings of the Historical Society of Pennsylvania. Vol. I. Nos. 1 to 4, inclusive. 1845. 8vo.—*From the Society.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XI. March, 1846. No. 3. 8vo.—*From Dr. Patterson.*

Astronomical Observations made at the Radcliffe Observatory, Oxford, in the Year 1843. By Manuel J. Johnson, M.A., Radcliffe Observer. Vol. IV. Published by order of the Radcliffe Trustees. Oxford, 1845. 8vo.—*From the Radcliffe Trustees.*

The Medical News and Library. Vol. IV. No. 40. April, 1846. 8vo.—*From Messrs. Lea & Blanchard.*

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D. No. XXII. New Series. April, 1846. 8vo. *From the Editor.*

Incunabula Artis Typographicæ in Suecia. Quibus Sollemnia Inaugurationis Philosophicæ a condita Academia Upsaliensi Septuagesimæ quintæ celebranda Litterarum Patronis Hospitibus Patribus civibusque Academicis et Urbicis. Indicit legitime constitutus promotor Johannes Henricus Schröder. Upsaliæ, 1842. 4to. *From the Author.*

Kongl. Vetenskaps-Societeten i Upsala. Dess Stiftelse, utbildning och verksamhet Berättelse af J. H. Schröder. Upsala, 1845. 8vo.—*From the Author.*

Report of the Majority and Minority of the Select Committee of the House, relative to the Abrogation of Capital Punishment. Harrisburg, 1846. 8vo.—*From C. B. Trego, Esq.*

Memoir of the Life and Character of John P. Emmet, M.D., Professor of Chemistry and Materia Medica in the University of Virginia. By George Tucker, Professor of Moral Philosophy in the University of Virginia. Philadelphia, 1845. 8vo.—*From the Author.*

Map of the Oregon Territory, by the United States Exploring Expedition, Charles Wilkes, Esq., Commander. *From Hon. Joseph R. Ingersoll.*

Histoire des Plantes de la Guiane Française, rangées suivant la Méthode sexuelle, avec plusieurs Mémoires sur différens Objets intéressans, relatifs à la Culture et au Commerce de la Guiane Française, et une Notice des Plantes de l'Isle-de-France. Par M. Fusée Aublet. Paris, 1775. 4to. Vols. 1 to 3, the 4th volume wanting.—*From Dr. Philip Tidyman, of Charleston, South Carolina.*

Dictionnaire de Chimie, contenant la Théorie et la Pratique de cette Science, son application à la Physique, à l'Histoire Naturelle, à la Médecine, et aux Arts dépendans de la Chimie. Par M.

Macquer. Seconde Édition. Paris, 1778. 2 Vols. 4to.—*From the same.*

Le Nouveau Parfait Maréchal, ou la Connoissance Générale et Universelle du Cheval. Par M. Fr. A. de Garsault. Troisième Édition. Paris, 1755. 4to.—*From the same.*

Œuvres de M. Franklin, Docteur ès Loix. Traduites de l'Anglais sur la Quatrième Édition. Par M. Barbeu Dubourg. Avec des additions nouvelles. Paris, 1773. 2 Vols. in 1. 4to.—*From the same.*

Histoire Philosophique et Politique des Établissemens et du Commerce des Européens dans les deux Indes. Par Guillaume Raynal. Geneva, 1780. 10 Volumes. 8vo.—*From the same.*

Recueil concernant le Tribunal de Nosseigneurs les Maréchaux de France. Par M. De Beaufort. Paris, 1784. 2 Vols. 8vo. *From the same.*

Histoire de l'Administration de Lord North, Ministre des Finances en Angleterre, depuis 1770, jusqu'en 1782, et de la Guerre de l'Amérique Septentrionale, jusqu'à la Paix. Suivie du Tableau Historique des Finances d'Angleterre, depuis Guillaume III. jusqu'en 1784. Paris, 1784. 2 Vols. 8vo.—*From the same.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten. Nos. 552 and 553. 4to.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XXI. No. 17 to 25, inclusive. 4to.

Dr. Boyè exhibited several mineralogical specimens from the bituminous coal measures of Pennsylvania; among others, sulphate of magnesia, both in fibrous crystals and in porous masses.

It was found in the neighbourhood of Salzburg, on the Kiskiminitas river, under a protruding ledge of rocks, from which the water, charged with the sulphate of magnesia, drops down.

Dr. B. also exhibited several specimens of argillaceous carbonate of iron, or nodular iron ore, containing, inside, a white crystalline mineral, which he had found to be sulphate of baryta; and also a curious nodular iron ore, from the neighbourhood of Brighton, on the Beaver creek, consisting of small oolitic concretions of iron ore (carbonate of iron with sesquioxide of iron) of a light brownish colour, and imbedded in a white sparry mass, consisting of a mixture of sulphate of baryta with some sulphate of lime and silica.

Mr. C. C. Biddle, from the Committee of Finance, in accordance with the resolution passed by the Society at its last meeting, made a report on the financial condition of the Society.

Stated Meeting, April 17.

Present, thirty-four members.

Dr. CHAPMAN, President, in the Chair.

Letters were announced and read:—

From the Librarian of the New York Historical Society, dated March, 1846, acknowledging the reception of donations from this Society:—

From Don Pedro de Angelis, Buenos Ayres, dated Dec. 5, 1845, with a donation to the Library: and,—

From Col. J. J. Abert, Washington, dated April 15, 1846, in relation to an obituary notice of Mr. Nicollet.

Professor Norton, a newly elected member, was introduced, and took his seat.

The following donations were announced:—

FOR THE LIBRARY.

Flora Batava, ou Figures et Descriptions de Plantes Belgiques. Par Jan Kops et J. E. Van der Trappen. No. 137. 4to.—*From H. M. the King of the Netherlands.*

Collections of the Massachusetts Historical Society. Vol. IX. of the Third Series. Boston, 1846. 8vo.—*From the Society.*

Summary of the Transactions of the College of Physicians of Philadelphia. From November, 1845, to March, 1846, inclusive. Vol. I. No. XI. 8vo.—*From the College.*

Annals of the Lyceum of Natural History of New York. Vol. IV. February, 1846. No. 5. 8vo.—*From the Lyceum.*

The African Repository and Colonial Journal. Vol. XXII. April, 1846. No. 4. 8vo.—*From the American Colonization Society.*

Catalogue of Works in Refutation of Methodism, from its Origin in 1729, to the Present Time. Compiled by H. C. Decanver. Philadelphia, 1846. 8vo.—*From the Compiler.*

Description of some New Species of Shells. By John H. Redfield. From the 6th Volume of Annals of New York Lyceum of Natural History.—*From the Author.*

Political Economy: its Objects, Uses, and Principles: considered with reference to the Condition of the American People. With a Summary for the use of Students. By A. Potter, D.D., Professor of Moral Philosophy in Union College. New York, 1842. 12mo. *From the Author.*

Handbook for Readers and Students; intended as a Help to Individuals, Associations, School Districts, and Seminaries of Learning, in the Selection of Works for Reading, Investigation, or Professional Study. In Three Parts. By A. Potter, D.D. New York, 1845. 12mo.—*From the Author.*

The School and the Schoolmaster. A Manual for the Use of Teachers, Employers, Trustees, Inspectors, &c. &c. In Two Parts. Part I. by Alonzo Potter, D.D., of New York. Part II. by Geo. B. Emerson, A.M., of Massachusetts. New York, 1846. 2 Vols. 12mo.—*From the Right Reverend Bishop Potter.*

A Discourse pronounced at Schenectady, July 22, 1845, on the Fiftieth Anniversary of the Foundation of Union College. By A. Potter, D.D. Schenectady, 1845. 8vo.—*From the Author.*

Coleccion de Documentos Oficiales sobre la Mision de los Ministros de S. M. Britanica, y S. M. el Rey de los Franceses cerca del Gobierno de Buenos-Aires, encargado de las relaciones exteriores de la Confederacion Argentina. Buenos-Aires, 1845. Folio. *From P. de Angelis.*

Mr. Lea read an obituary notice of the late Mathew Carey, Esq., prepared at the request of the Society. On motion of Mr. C. C. Biddle, it was placed at the disposal of the author.

Prof. Frazer read a letter from Major J. D. Graham, dated April 14th, 1846, communicating a paper for the Transactions, on the Dip of the Needle, at three additional stations.

It was referred to the following Committee:—Mr. Frazer, Dr. Patterson, Mr. Walker.

The Society having considered and disposed of all other business, proceeded to an election for members; and upon an examination of the ballot boxes, Mr. Lewis Waln, and Professor James H. Rogers, of this city, were announced as duly elected.

On motion of Mr. Ord, a copy of the Bulletin was ordered

to be presented to the Historical Society of Pennsylvania, and also to the Right Rev. Alonzo Potter; and that the Bulletin be hereafter regularly sent to the Historical Society.

Stated Meeting, May 1.

Present, seventeen members.

Dr. PATTERSON, Vice-President, in the Chair.

Letters were received and read:—

From the Royal Institution of London, dated February 23, 1846:—

From the Botanical Society of London, dated London, March, 1846, acknowledging the reception of Nos. 32 and 33 of the Bulletin of the Society:—

From the Horticultural Society of London, dated March 3, 1846:—

From the Geological Society of London, dated Feb. 26, 1846:—

From the Royal Asiatic Society of London, dated Feb. 21, 1846, acknowledging the reception of Vol. IX, Part 2, of the Transactions of this Society, and of Nos. 32 and 33 of the Proceedings:—

From the Académie Royale des Sciences of Stockholm, dated Nov. 1, 1845, acknowledging the reception of Vol. IX, Part 1, of the Transactions, and of Nos. 21, 22, and Nos. 28 to 31 of the Proceedings of this Society, and of Dr. Dunglison's Eulogy on P. S. Duponceau, Esq. Also informing the Society that it had transmitted certain donations for the Library:—

From the Corporation of the University of Cambridge, Mass., dated March 11 and 24, acknowledging the reception of the Proceedings, No. 34, and of Vol. IX, Part 2, of the Transactions:—

From Sir James Clark, dated London, April 2, 1846: from Dr. Holland, dated April 3, 1846: and from Dr. J. H. Rogers,

dated Philadelphia, May 1, 1846, returning their acknowledgments for being made members of the Society:—and

From the Franklin Institute, dated April 11, 1846, replying to a communication from this Society, in relation to the proposal of the Academy of Arts and Sciences, to unite with this Society and the Franklin Institute in a Memorial to the Government, asking an extension of Meteorological Observations, and stating that the Franklin Institute had appointed a Committee to act thereon.

Mr. Lewis Waln, a newly elected member, was introduced, and took his seat.

The following donations were announced:—

FOR THE LIBRARY.

Kongl. Vetenskaps-Akademiens Handlingar, för år 1843. Stockholm, 1844. 8vo.—*From the Royal Academy of Sciences of Stockholm.*

Årsberättelse om Framstegen i Kemi och Mineralogi afgifven den 31 Mars, 1845; af Jac. Berzelius, K. V. Akad. Sek. Stockholm, 1845. 8vo.—*From the same.*

Årsberättelse om Zoologiens Framsteg under åren 1840–1842 till Kongl. Vetenskaps-Akademien afgifven af Zoologiæ Intendenterna vid Rikets Naturhistoriska Museum. Första Delen (Anim. Vertebrata) af C. J. Sundevall. Stockholm, 1844. 8vo.—*From the same.*

Årsberättelse om Zoologiens Framsteg under åren 1843 och 1844 till Kongl. Vetenskaps-Akademien afgifven af Zoologiæ Intendenterna vid Rikets Naturhistoriska Museum. Andra Delen (Insecta, Linn.) af C. H. Boheman. Stockholm, 1845. 8vo.—*From the same.*

Års-Berättelser om Botaniska Arbeten och Upptäckter för åren 1839, 1840, 1841 och 1842, till Kongl. Vetenskaps-Akademien afgifna den 31 Mars åren 1839, 1840, 1841 och 1842. Af Joh. Em. Wikström. Stockholm, 1844. 8vo.—*From the same.*

Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Första Årgången.

1844, Nos. 8 to 10, inclusive.

1845, Nos. 1 to 7, inclusive. 8vo.—*From the same.*

Memoirs of the Royal Astronomical Society. Vol. XV. With four copperplates. London, 1846. 4to.—*From the Society.*

Monthly Notices of the Royal Astronomical Society. Vol. VII. January 9, 1846. No. 3. 8vo.—*From the same.*

Proceedings of the Boston Society of Natural History, January 21, February 18, 1846. 8vo.—*From the Society.*

Proceedings of the Historical Society of Pennsylvania. Vol. I. March, 1846. No. 5. 8vo.—This number contains the Journal of Isaac Senter, physician and surgeon to the troops detached from the American army encamped at Cambridge, Massachusetts, on a secret expedition against Quebec, under the command of Col. Benedict Arnold, in September, 1775.—*From the Society.*

Proceedings of the Providence Franklin Society. Vol. I. April, 1846. No. 1. 8vo.—*From the Society.*

Catalogue of the New York State Library, January 1, 1846.—*From the Trustees.*

Fifty-ninth Annual Report of the Regents of the University of the State of New York, made to the Legislature, March 1, 1846. 8vo. *From the Regents.*

The African Repository and Colonial Journal. Vol. XXII. May, 1846. No. 5. 8vo.—*From the American Colonization Society.*

Journal of the Franklin Institute of the State of Pennsylvania. Third Series. Vol. XI. April, 1846. No. 4. 8vo.—*From Dr. Patterson.*

An Account of the Portage Rail Road over the Alleghany Mountain, in Pennsylvania. By S. W. Roberts, Principal Assistant Engineer thereon. Philadelphia, 1836. 12mo.—*From the Author.*

Prof. Frazer, on the part of the Committee to whom the communication of Major J. D. Graham, read at the last meeting, was referred, recommended the publication of the same in the Transactions of the Society, which was so ordered.

Dr. Bache reported the death of Prof. T. W. Bessel, of the University of Königsberg, a member of this Society.

Prof. Frazer referred to the principal labours of Prof. Bessel, and moved that Prof. Kendall be requested to prepare a notice of his contributions to science.

Mr. C. O. Boutelle presented to the Society, through Dr. Patterson, a work by him, entitled "Tables of Bearings, Distances, Latitudes, and Longitudes, ascertained by the Astronomical and Trigonometrical Survey of Massachusetts." Dr. Patterson made some observations on this survey of Massa-

chusetts by Messrs. Paine and Borden, a portion of whose labours are contained in the Transactions of this Society. The work of Mr. Boutelle gives the more detailed results of the same undertaking.

Dr. Patterson informed the Society, that the recent solar eclipse was observed at the High School Observatory, by Prof. Kendall and himself. The following note gives the results of their observations:

May 1st, 1846.

DEAR SIR,—The observations of the Solar Eclipse of April 24th, and 25th, 1846, made at the High School Observatory, are as follows, in mean time of the Observatory:

Beginning	24*d*	22*h*	46*m*	40*s*.3,	observed by Dr. Patterson.
„	„	„	„	37.3,	„ E. O. Kendall.
„	24	22	46	38.8,	mean.

The power used by yourself with the Plössl was, I think, about 50; and that used with the equatorial was 85.

Very respectfully, yours,

E. OTIS KENDALL.

Dr. R. M. PATTERSON.

Stated Meeting, May 15.

Present, twenty-one members.

Dr. CHAPMAN, President, in the Chair.

No correspondence was announced.

The following donations were announced:—

FOR THE LIBRARY.

The American Journal of Science and Arts. Conducted by Prof. Silliman, B. Silliman, Jr., and James D. Dana. Second Series. No. 3. May, 1846. 8vo.—*From the Editors.*

A Synopsis of the Fishes of North America. By David Humphreys Storer, M.D. Cambridge (Mass.), 1846. 4to.—*From the Author.*

Tables of Bearings, Distances, Latitudes, Longitudes, &c., ascer-

tained by the Astronomical and Trigonometrical Survey of Massachusetts. Published agreeably to a Resolve of the General Court, by John G. Palfrey, Secretary of the Commonwealth. Boston, 1846. 8vo.—*From Charles O. Boutelle.*

The Medical News and Library. Vol. IV. May, 1846. No. 41. 8vo.—*From Messrs. Lea & Blanchard.*

Facts and Considerations relative to Duties on Books; addressed to the Library Committee of Brown University. By C. C. Jewett. Providence, 1846. 8vo.—*From Mr. John Penington.*

Mr. Alger on New Localities of Rare Minerals, and the Identity of Species supposed to be Distinct. From the Transactions of the Boston Society of Natural History. *From the Author.*

The President announced the death of Dr. Mease, which took place the 14th instant, in the 75th year of his age.

On motion of Dr. Bache, Dr. Elwyn was appointed to prepare an obituary notice of the deceased.

Mr. Lea announced the death of Mr. John Pickering, of Boston, a member of this Society.

The report of the meeting of the Board of Officers and Council, held 8th of May, 1846, was read.

Special Meeting, May 29.

Present, twenty-three members.

Dr. CHAPMAN, President, in the Chair.

Mr. Ord moved that the special business of the meeting be postponed, for the purpose of considering a communication from the Athenian Institute.

A letter was then read from the Secretary of the Athenian Institute, dated May 15th, 1846, conveying a resolution in the following words:—

At a meeting of the Counsellors of the Athenian Institute, held on the evening of May 12th, 1846, the following resolution was unanimously adopted, viz.—

Resolved, That whenever he shall be so directed in writing by this Committee, the Treasurer shall loan to the American Philosophical

Society, held at Philadelphia, for promoting Useful Knowledge, three-fourths of the funds belonging to the Institute, for four years, without interest; and shall loan to the Historical Society of Pennsylvania one-fourth of the remainder of such funds, for four years, without interest; the said loans to be secured by bond and warrant of attorney.

Mr. Sill's letter mentioned that the amount which might be expected by the Society, will be from $700 to $900.

On motion of Dr. Patterson—*Resolved*, That the loan offered by the Athenian Institute be accepted by the Society, and that the President and Treasurer be instructed to affix the corporate seal to the stipulated securities.

Resolved, That the Secretary be instructed to convey to the Counsellors of the Athenian Institute, the acknowledgments of the Society for the aid so liberally tendered.

On motion of Mr. Fraley, the Society proceeded to consider the alteration of the By-laws, proposed at the meeting of the 15th instant.

Stated Meeting, June 19.

Present, twenty-six members.

Dr. Patterson, Vice-President, in the Chair.

Letters were announced and read:—

From the Linnean Society of London, dated April 2d, 1846, acknowledging the receipt of the Transactions of the Society, Vol. IX. Part 2d, and of the Proceedings, Nos. 32 and 33:—

From the Royal Institute of Sciences, Belles Lettres and Arts, of the Low Countries, dated Amsterdam, Jan. 23, 1846, on transmitting a part of the Transactions of the Institution:—

From the Historical Society of New York, dated New York, May 22d, 1846, on transmitting copies of a circular in reference to proposed changes in the tariff, as affecting the interests of literary institutions:—

From the Local Committee of the Association of American

Geologists and Naturalists, dated New York, June 5th, 1846, transmitting copies of circulars of the Association:—

From Signor Zantedeschi, dated Venice, Aug. 14, 1845, on transmitting a donation to the Society:—

From Von Hammer Purgstall, dated Vienna, Feb. 25, 1846, on transmitting a donation to the Society:—

From the friends of the late Prof. Bessel, dated Konigsberg, March 21, 1846, announcing his death:—

From the family of the late Mr. Pickering, of Boston, dated Boston, June 9th, 1846, on returning a MS. of Mr. S. S. Haldeman's to the Secretary:—and,

From Mr. Henry M'Ilvaine, dated Philadelphia, June 11, 1846, asking for two Mexican silver drinking cups, and a cestus, deposited many years ago by Mr. Joseph E. Bloomfield.

On motion of Mr. Ord, the Curators were authorized to return the articles deposited in the Cabinet to Mr. M'Ilvaine, as the representative of Mr. Bloomfield.

The following donations were announced:—

FOR THE LIBRARY.

Bulletin de la Société de Géographie. Troisième Série. Tome IV. Paris, 1845. 8vo.—*From the Society.*

Journal Asiatique. Quatrième Série. Tome VI. No. 28. Novembre, 1845. No. 29. Décembre, 1845. Tome VII. No. 30. Janvier, 1846. No. 31. Février, 1846. 8vo.—*From the Asiatic Society of Paris.*

Annales des Mines. Quatrième Série. Tome VII. 3e Livraison de 1845. Tome VIII. 4e Livraison de 1845. 8vo.—*From the Engineers of Mines, of Paris.*

The Journal of the Royal Asiatic Society of Great Britain and Ireland. No. XVI. Part 2. London, 1846. 8vo.—*From the Society.*

Monthly Notices of the Royal Astronomical Society. Vol. VII. Nos. 4, 5, and 6. 8vo.—*From the Society.*

The Quarterly Journal of the Geological Society of London. Edited by the Vice-Secretary of the Geological Society. Volume the First. 1845. Volume the Second. Part 1. No. 5. 1846. 8vo. *From the Geological Society.*

Nieuwe Verhandelingen der Eerste Klasse van het Koninklijk-Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone

Kunsten te Amsterdam. Twaalfden Deels eerste Stuk. Amsterdam, 1846. 4to.—*From the Royal Institute, Amsterdam.*

Proceedings of the Boston Society of Natural History. March 4th and 18th, 1846. 8vo.—*From the Society.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. III. Nos. 1 and 2. Title and Index to Vol. II. 8vo.—*From the Academy.*

The African Repository and Colonial Journal. Vol. XXII. June, 1846. No. 6. 8vo.—*From the American Colonization Society.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XI. Nos. 5 and 6. 8vo.—*From Dr. Patterson.*

The Annals and Magazine of Natural History, including Zoology, Botany, and Geology. Vol. XVI. Nos. 106, 107, and 108. Vol. XVII. Nos. 109, 110, and 111. 8vo.—*From Sir Wm. Jardine, Bart.*

The Electrical Magazine. Conducted by Mr. Charles V. Walker. Vol. II. No. 12. April, 1846. 8vo.—*From the Editor.*

Tijdschrift voor Natuurlijke Geschiedenis en Physiologie. Uitgegeven door J. Van der Hoeven, M.D., en W. H. de Vriese, M.D. Twaalfde Deel, 3e en 4e Stuk. Leiden, 1845. 8vo.—*From the Editors.*

Waarnemingen en Proeven over de Onlangs Geheerscht Hebbende Ziekte der Aardappelen, door G. Vrolik.—*From W. Vrolik.*

Verslag der Eerste Klasse van het Koninklijk-Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone Kunsten, over de heerschende ziekte der Aardappelen.—*From the same.*

Trattato del Magnetismo e della Elettricità dell' Ab. Francesco Zantedeschi. Parte II. Venezia, 1845. 8vo.—*From the Author.*

Descrizione di una Machina a disco per la doppia Elettricità e delle esperienze esequite con essa comparativamente a quelle dell' elettromotore Voltiano del Prof. Ab. Francesco Zantedeschi. Venezia, 1845.—*From the same.*

Geological Survey of Canada. Report of Progress for the Year 1844. Montreal, 1846. 8vo.—*From W. E. Logan, Provincial Geologist.*

Jahrbücher der Literatur. Nos. 109 to 112, inclusive. January to December, 1845. 8vo.—*From Baron Von Hammer Purgstall.*

Twenty-ninth Congress, First Session. House of Representatives. Document, No. 140. Report of the Commissioners of Patents for the Year 1845. 8vo.—*From the Hon. Joseph R. Ingersoll.*

Report to the Committee of the City Council appointed to obtain the Census of Boston for the Year 1845, embracing Collateral Facts and Statistical Researches, illustrating the History and Condition of the Population, and their means of Progress and Prosperity. By Lemuel Shattuck. Boston, 1846. 8vo.—*From the Author.*

The Mutations of the Earth; or an Outline of the more Remarkable Physical Changes, of which, in the progress of time, this Earth has been the subject and the theatre, &c. &c. Being the Anniversary Discourse for 1846, delivered before the Lyceum of Natural History of New York. By John Augustine Smith, M.D. 8vo.—*From the Author.*

Observations sur le Voyage au Darfour, etc. Par M. Jomard. 8vo. *From the Author.*

Seconde Note sur une Pierre gravée, trouvée dans un ancien Tumulus Américain. Lue à l'Académie des Inscriptions et Belles-Lettres, le 10 Novembre, 1845. Par M. Jomard. 8vo.—*From the same.*

La Collection Géographique de la Bibliothèque Royale, en 1845. Par M. Jomard.—*From the same.*

State of the Accounts of the Pennsylvania Hospital, for the Year ending Fourth Month 25, 1846. 8vo.—*From the Managers.*

The Medical News and Library. Vol. IV. June, 1846. No, 42. 8vo.—*From Messrs. Lea & Blanchard.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten, Nos. 554, 555, 556. March 16th, April 2d and 8th. Altona, 1846. 4to.

Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences. Tome XXI. No. 26. Décembre, 1845. Tome XXII. Nos. 1 to 12 inclusive. Janvier 5 à Mars 23, 1846. 4to.

Annales de Chimie et de Physique. Troisième Série. Tome XVI. Paris, 1846.

The presiding officer announced the death of Mr. Redmond Conyngham, of Paradise, County of Lancaster, a member of this Society, who died on the 16th inst., at the age of 64. On motion of Mr. Ord, Bishop Potter was requested to prepare an obituary notice of the deceased.

A portion of a communication from Miss Reynolds to the Rev. Archibald Alexander, of Princeton, detailing a condition

of two distinct states of consciousness, of which she described herself as the subject, was read.

On motion, the communication was referred to a Committee, consisting of Dr. Hays, Dr. Coates, and Dr. Bell.

Prof. Henry presented a paper from Capt. Stockton, U. S. Navy, entitled, "On some of the Results of a Series of Experiments, relative to different parts of Gunnery," which was referred to a Committee, consisting of Prof. Henry, Prof. Frazer, and Dr. Patterson.

A letter from S. D. Ingham to Dr. Patterson was read, detailing cases in which the telegraphic wires were struck by lightning, and asking the attention of the Society to some interesting questions connected with the mode in which the wires may be affected by electricity.

New Hope, 5th June, 1846.

My dear Sir,—I have recently observed a fact, which it may be interesting to investigate. During a heavy *thunder shower*, as we say, on the 25th ult., several poles which support the wires of the new telegraph were stricken by the lightning. In one case, *four* in succession, and in another, *two;* this happened within three-quarters of a mile of my house. I hear, also, that many others between this and Doylestown are also marked with the lightning. The wires do not appear to be affected. The first appearance of effect on the poles is where the tenon enters the cross-bar on the top. A knowledge of the modus in which the electric charge passes along the wires, might aid in determining whether the telegraph, as constructed, will be a protection, or increase the danger from lightning. Why does the electricity leave the copper wire, and pass off into wood, without affecting the wire? We want to know by experiment, from those who are skilled in these matters, and are provided with apparatus, whether our security is increased or lessened by the construction of the telegraphic machinery. The poles are set along the road upon which persons are constantly passing with horses, carriages, &c., which, for aught we know, may be as likely to attract the electric matter from the surcharge as a wooden pole; and if such be the fact, what is the best remedy? Will frequent conductors on the poles be a sufficient security?

This subject deserves consideration in another point of view; for if it should happen that any person should be killed by lightning on the

road near the conducting wires, the telegraph will very probably soon be demolished, and might not easily be again renewed.

Will you have the goodness to present this subject to the consideration of the Philosophical Society, and invite the attention of the members to it; and accept the assurance of the very great respect of

Your most obedient,

Dr. Robt. Patterson. S. D. INGHAM.

Professor Henry, to whom the foregoing letter was referred, made the following report:—

The action of the electricity of the atmosphere on the wires of the electrical telegraph, is at the present time a subject of much importance, both on account of its practical bearing, and the number of purely scientific questions which it involves. I have accordingly given due attention to the letter referred to me, and have succeeded in collecting a number of facts in reference to the action in question. Some of these are from the observations of different persons along the principal lines, and others from my own investigations during a thunder storm on the 19th of June, when I was so fortunate as to be present in the office of the telegraph in Philadelphia, while a series of very interesting electrical phenomena was exhibited. In connexion with the facts derived from these sources, I must ask the indulgence of the Society in frequently referring, in the course of this communication, to the results of my previous investigations in dynamic electricity, accounts of which are to be found in the Proceedings and Transactions of this Institution.

From all the information on the subject of the action of the electricity of the atmosphere on the wires of the telegraph, it is evident that effects are produced in several different ways.

1. The wires of the telegraph are liable to be struck by a direct discharge of lightning from the clouds, and several cases of this kind have been noticed during the present season. About the 20th of May the lightning struck the elevated part of the wire, which is supported on a high mast at the place where the telegraph crosses the Hackensack river. The fluid passed along the wire each way from the point which received the discharge, for several miles, striking off at irregular intervals down the supporting poles. At each place where the discharge to a pole took place, a number of sharp explosions were heard in succession, resembling the rapid reports of several rifles. During another storm, the wire was struck in two places in Pennsyl-

vania, on the route between Philadelphia and New York; at one of these places twelve poles were struck, and at the other eight. In the latter case, the remarkable fact was observed, that every other pole escaped the discharge; and the same phenomenon was observed, though in a less marked degree, near the Hackensack river. In some instances the lightning has been seen coursing along the wire in a stream of light; and in another case it is described as exploding from the wire at certain points, though there were no bodies in the vicinity to attract it from the conductor.

In discussing these, and other facts to be mentioned hereafter, we shall, for convenience, adopt the principles and language of the theory which refers the phenomena of electricity to the action of a fluid, of which the particles repel each other, and are attracted by the particles of other matter. Although it cannot be affirmed that this theory is an actual representation of the cause of the phenomena, as they are produced in nature, yet it may be asserted that it is, in the present state of science, an accurate mode of expressing the laws of electrical action, so far as they have been made out; and that though there are a number of phenomena which have not as yet been referred to this theory, there are none which are proved to be directly at variance with it.

That the wires of the telegraph should be frequently struck by a direct discharge of lightning, is not surprising, when we consider the great length of the conductor, and, consequently, the many points along the surface of the earth through which it must pass, peculiarly liable to receive the discharge from the heavens. Also, from the great length of the conductor, the more readily must the repulsive action of the free electricity of the cloud drive the natural electricity of the conductor to the farther end of the line, thus rendering more intense the negative condition of the nearer part of the wire, and, consequently, increasing the attraction of the metal for the free electricity of the cloud. It is not, however, probable that the attraction, whatever may be its intensity, of so small a quantity of matter as that of the wire of the telegraph, can of itself produce an electrical discharge from the heavens: although, if the discharge were started by some other cause, such as the attraction of a large mass of conducting matter in the vicinity, the attraction of the wire might be sufficient to change the direction of the descending bolt, and draw it in part or in whole to itself. It should also be recollected, that on account of the perfect conduction, a discharge on any part of the wire

must affect every other part of the connected line, although it may be hundreds of miles in length.

That the wire should give off a discharge to a number of poles in succession, is a fact I should have expected, from my previous researches on the lateral discharge of a conductor transmitting a current of free electricity. In a paper on this subject, presented to the British Association in 1837, I showed that when electricity strikes a conductor explosively, it tends to give off sparks to all bodies in the vicinity, however intimately the conductor may be connected with the earth. In an experiment in which sparks from a small machine were thrown on the upper part of a lightning rod, erected in accordance with the formula given by the French Institute, corresponding sparks could be drawn from every part of the rod, even from that near the ground. In a communication since made to this Society, I have succeeded in referring this phenomenon to the fact, that during the transmission of a quantity of electricity along a rod, the surface of the conductor is charged in succession, as it were, by a wave of the fluid, which, when it arrives opposite a given point, tends to give off a spark to a neighbouring body, for the same reason that the charged conductor of the machine gives off a spark under the same circumstances.

It might at first be supposed that the redundant electricity of the conductor would exhaust itself in giving off the first spark, and that a second discharge could not take place; but it should be observed, that the wave of free electricity, in its passage, is constantly attracted to the wire by the portion of the uncharged conductor which immediately precedes its position at any time; and hence but a part of the whole redundant electricity is given off at one place; the velocity of transmission of the wave as it passes the neighbouring body, and its attraction for the wire, preventing a full discharge at any one place. The intensity of the successive explosions is explained by referring to the fact, that the discharge from the clouds does not generally consist of a single wave of electricity, but of a number of discharges along the same path in rapid succession, or of a continuous discharge which has an appreciable duration; and hence the wire of the telegraph is capable of transmitting an immense quantity of the fluid thus distributed over a great length of the conductor.

The remarkable facts of the explosions of the electricity into the air, and of the poles being struck in interrupted succession, find a plausible explanation in another electrical principle which I have established, namely, in all cases of the disturbance of the equili-

brium of the electrical plenum, which we must suppose to exist throughout all terrestrial space, the state of rest is attained by a series of diminishing oscillations. Thus, in the discharge of a Leyden jar, I have shown that the phenomena exhibited cannot be explained by merely supposing the transfer of a quantity of fluid from the inner to the outer side of the jar; but in addition to this we are obliged to admit the existence of several waves, backwards and forwards, until the equilibrium is attained. In the case of the discharge from the cloud, a wave of the natural electricity of the metal is repelled each way from the point on which the discharge falls, to either end of the wire, is then reflected, and in its reverse passage meets in succession the several waves which make up the discharge from the cloud. These waves will therefore interfere at certain points along the wire, producing, for a moment, waves of double magnitude, and will thus enhance the tendency of the fluid at these points to fly from the conductor. I do not say that the effects observed were actually produced in this way; I merely wish to convey the idea that known principles of electrical action might, under certain circumstances, lead us to anticipate such results.

2. The state of the wire may be disturbed by the conduction of a current of electricity from one portion of space to another, without the presence of a thunder cloud; and this will happen in case of a long line, when the electrical condition of the atmosphere which surrounds the wire at one place is different from that at another. Now it is well known that a mere difference in elevation is attended with a change in the electrical state of the atmosphere. A conductor, elevated by means of a kite, gives sparks of positive electricity in a perfectly clear day; hence, if the line of the telegraph passes over an elevated mountain ridge, there will be continually, during clear weather, a current from the more elevated to the lower points of the conductor.

A current may also be produced in a long level line, by the precipitation of vapour in the form of fog at one end, while the air remains clear at the other; or by the existence of a storm of rain or snow at any point along the line, while the other parts of the wire are not subjected to the same influence.

Currents of sufficient power to set in motion the marking machine of the telegraph have been observed, which must have been produced by some of these causes. In one case the machine spontaneously began to operate without the aid of the battery, while a snow storm was falling at one end of the line, and clear weather existed at the other.

On another occasion, a continued stream of electricity was observed to pass between two points at a break in the wire, presenting the appearance of a gas-light almost extinguished. A constant effect of this kind indicates a constant accession of electricity at one part of the wire, and a constant discharge at the other.

3. The natural electricity of the wire of the telegraph is liable to be disturbed by the ordinary electrical induction of a distant cloud. Suppose a thunder-cloud, driven by the wind in such a direction as to cross one end of the line of the telegraph at the elevation, say of a mile; during the whole time of the approach of the cloud to the point of its path directly above the wire, the repulsion of the redundant electricity with which it is charged would constantly drive more and more of the natural electricity of the wire to the farther end of the line, and would thus give rise to a current. When the cloud arrived at the point nearest to the wire, the current would cease for a moment; and as the repulsion gradually diminished by the receding of the cloud, the natural electricity of the wire would gradually return to its normal state, giving rise to a current in an opposite direction. If the cloud were driven by the wind parallel to the line of the telegraph, a current would be produced towards each end of the wire, and these would constantly vary in intensity with the different positions of the cloud. Although currents produced in this way may be too feeble to set in motion the marking apparatus, yet they may have sufficient power to influence the action of the current of the battery so as to interfere with the perfect operation of the machine.

4. Powerful electrical currents are produced in the wires of the telegraph by every flash of lightning which takes place within many miles of the line, by the action of dynamic induction; which differs from the action last described, in being the result of the influence of electricity *in motion* on the natural electricity of the conductor. The effect of this induction, which is the most fruitful source of disturbance, will be best illustrated by an account of some experiments of my own, presented to the Society in 1843. A copper wire was suspended by silk strings around the ceiling of an upper room, so as to form a parallelogram of about sixty feet by thirty on the sides; and in the cellar of the same building, immediately below, another parallelogram of the same dimensions was placed. When a spark from an electrical machine was transmitted through the upper parallelogram, an induced current was developed in the lower one, sufficiently powerful to magnetize needles, although two floors intervened, and the conductors were separated to the distance of thirty feet. In this

experiment no electricity passed through the floors from one conductor to the other; the effect was entirely due to the repulsive action of the electricity in motion in the upper wire on the natural electricity of the lower. In another experiment, two wires, about 400 feet long, were stretched parallel to each other between two buildings; a spark of electricity sent through one produced a current in the other, though the two were separated to the distance of 300 feet; and from all the experiments, it was concluded that the distance might be indefinitely increased, provided the wires were lengthened in a corresponding ratio.

That the same effect is produced by the repulsive action of the electrical discharge in the heavens, is shown by the following modification of the foregoing arrangement. One of the wires was removed, and the other so lengthened at one end, as to pass into my study, and thence through a cellar window into an adjacent well. With every flash of lightning which took place in the heavens within at least a circle of twenty miles around Princeton, needles were magnetized in the study by the induced current developed in the wire. The same effect was produced by soldering a wire to the metallic roof of the house, and passing it down into the well; at every flash of lightning a series of currents in alternate directions was produced in the wire.

I was also led, from these results, to infer that induced currents must traverse the line of a rail-road, and this I found to be the case. Sparks were seen at the breaks in the continuity of the rail, with every flash of a distant thunder cloud.

Similar effects, but in a greater degree, must be produced on the wire of the telegraph, by every discharge in the heavens; and the phenomena which I witnessed on the 19th of June in the telegraph office in Philadelphia, were, I am sure, of this kind. In the midst of the hurry of the transmission of the congressional intelligence from Washington to Philadelphia, and thence to New York, the apparatus began to work irregularly. The operator at each end of the line announced at the same time a storm at Washington, and another at Jersey City. The portion of the circuit of the telegraph which entered the building, and was connected with one pole of the galvanic battery, happened to pass within the distance of less than an inch of the wire which served to form the connexion of the other pole with the earth. Across this space, at an interval of every few minutes, a series of sparks in rapid succession was observed to pass; and when one of the storms arrived so near Philadelphia that the lightning could be seen, each series of sparks was found to be simultaneous

with a flash in the heavens. Now we cannot suppose, for a moment, that the wire was actually struck at the time each flash took place; and indeed it was observed that the sparks were produced when the cloud and flash were at the distance of several miles to the east of the line of the wire. The inevitable conclusion is, that all the exhibition of electrical phenomena witnessed during the afternoon, was purely the effects of induction, or the mere disturbance of the natural electricity of the wire at a distance, without any transfer of the fluid from the cloud to the apparatus.

The discharge between the two portions of the wire continued for more than an hour, when the effect became so powerful, that the superintendent, alarmed for the safety of the building, connected the long wire with the city gas pipes, and thus transmitted the current silently to the ground. I was surprised at the quantity and intensity of the current; it is well known, that to affect a common galvanometer with ordinary electricity, requires the discharge of a large battery; but such was the quantity of the induced current exhibited on this occasion, that the needle of an ordinary vertical galvanometer, with a short wire, and apparently of little sensibility, was moved several degrees.

The pungency of the spark was also, as might have been expected, very great. When a small break was made in the circuit, and the parts joined by the forefinger and thumb, the discharge transmitted through the hand affected the whole arm up to the shoulder. I was informed by the superintendent, that on another occasion a spark passed over the surface of the spool of wire, surrounding the legs of the horse-shoe magnet at right angles to the spires; and such was its intensity and quantity, that all the wires across which it passed were melted at points in the same straight line as if they had been cut in two by a sharp knife.

The effects of the powerful discharges from the clouds may be prevented, in a great degree, by erecting at intervals along the line, and aside of the supporting poles, a metallic wire, connected with the earth at the lower end, and terminating above at the distance of about half an inch from the wire of the telegraph. By this arrangement the insulation of the conductor will not be interfered with, while the greater portion of the charge will be drawn off. I think this precaution of great importance at places where the line crosses a river, and is supported on high poles. Also in the vicinity of the office of

the telegraph, where a discharge, falling on the wire near the station, might send a current into the house of sufficient quantity to produce serious accidents. The fate of Professor Richman, of St. Petersburg, should be recollected, who was killed, by a flash from a small wire, which entered his house from an elevated pole, while he was experimenting on atmospheric electricity.

The danger, however, which has been apprehended from the electricity leaving the wire and discharging itself into a person on the road, is, I think, very small; electricity, of sufficient intensity to strike a person at the distance of eight or ten feet from the wire, would, in preference, be conducted down the nearest pole. It will, however, in all cases, be most prudent to keep at a proper distance from the wire during the existence of a thunder storm in the neighbourhood.

It may be mentioned as an interesting fact, derived from two independent sources of information, that large numbers of small birds have been seen suspended by the claws from the wire of the telegraph. They had, in all probability, been instantaneously killed, either by a direct discharge, or an induced current from a distant cloud, while they were resting on the wire.

Though accidents to the operators, from the direct discharge, may be prevented by the method before mentioned, yet the effect on the machine cannot be entirely obviated; the residual current which escapes the discharge along the perpendicular wires, must neutralize, for a moment, the current of the battery, and produce irregularity of action in the apparatus.

The direct discharge from the cloud on the wire is, comparatively, not a frequent occurrence, while the dynamic inductive influence must be a source of constant disturbance during the season of thunder storms; and no other method presents itself to my mind at this time for obviating the effect, but that of increasing the size of the battery, and diminishing the sensibility of the magnet, so that, at least, the smaller induced currents may not be felt by the machine. It must be recollected, that the inductive influence takes place at a distance through all bodies, conductors and non-conductors; and hence no coating that can be put upon the wire will prevent the formation of induced currents.

I think it not improbable, since the earth has been made to act the part of the return conductor, that some means will be discovered for insulating the single wire beneath the surface of the earth; the difficulty in effecting this is by no means as great as that of insulating

two wires, and preventing the current striking across from one to the other. A wire, buried in the earth, would be protected, in most cases, from the effect of a direct discharge; but the inductive influence would still be exerted, though perhaps in a less degree.

The wires of the telegraph are too small and too few in number to affect, as some have supposed, the electrical condition of the atmosphere, by equalizing the quantity of the fluid in different places, and thus producing a less changeable state of the weather. The feeble currents of electricity which must be constantly passing along the wires of a long line, may, however, with proper study, be the means of discovering many interesting facts relative to the electrical state of the air over different regions.

A communication was read from Prof. Locke, of Cincinnati, detailing certain phenomena of terrestrial magnetism, as observed in the trap rock of the Brandywine, which exhibited manifest polarity.

Prof. Frazer stated that some of the trap rock of the Brandywine contained magnetic pyrites; and if the rock alluded to by Prof. Locke contained pyrites, it might account for the phenomena.

Mr. Haldeman made the following remarks on the Phonology of the Wyandots.

Missionaries and others have asserted that the peculiarities of this language are such that it cannot be reduced to writing. A tolerably thorough examination of it, with the assistance of Mr. J. E. Armstrong, a native, have shown that this is not the fact. To a person unaccustomed to rigid analysis of the sounds capable of being produced by the organs of speech, it would be found much more difficult to appreciate the peculiarities of the Cherokee.

The Wyandot alphabet is as follows:—1. i (in *field*), 2. ɪ (*fit*), 3. e (*where*), 4. ɛ (*met*), 5. ɜ̨ (*man*, nasal), 6. a (far), 7. ɑ (*flaw*, nȯt), 8. ǫ (*moan*, *no*, nasal), 9. ʊ (*word*, nůt), 10. u (*rule*, fůll), 11. w (English in *we*), 12. m, 13. n, 14. d, 15″. ʧ, 15′. t, 16. ɾ̊ (the smooth English sound, never vibrant), 17. ʒ (*azure*, French j), 18. s (*hiss*), 19. ʃ (*ship*, French *ch*), 20. j (*year*, German *jahr*, Italian *jeri*), 21. g (*gui* in *get*), 22″. ʞ, 22′. k, 23. χ (Greek, German *ich*), 24. h (English and German initial in *held*), 25. ˃ (close of the glottis).

The series of vowels is very full, amounting to the five primaries

and five of the secondaries. Several of them are subject to nasality, and two of them, ɤ in *man* (French *vin*), and o in *moan* (French *món*), present the peculiarity of being almost always nasalized; the o, probably, is never natural.

The labial consonants, except Mi, and the English Wi, are wanting. The 20th letter is frequently nasalized; and when it follows N as a nasal, the two become identical with the Spanish ñ, which is not an uncommon sound. The German combination *ts* is also somewhat common.

Besides the ordinary *gui* and *ki*, there is a *hard ki*, which has every quality of *gui*, except vocality, as in ȧ l l **k** ɛ̆ s i, *Allegeny*. This is heard in other Indian languages, and also in German. The *ti* more rarely assumes the same character, as in **t** u ɻ ʂ ˃, an *axe*.

The *hi* (No. 24), presents the peculiarity of being heard with its usual force after a vowel, or as a final; and it is frequently nasalized. Nasal syllables of several letters sometimes occur, as ḫ o̧ t à ˃ (the *ear*), a w n d ɛ r r ɤ̣ ḫ ą ɯ̣ (for ever). The final *hi*, after the close of the glottis, is merely the breath which follows the subsequent opening of the passage, and should properly be represented by the Greek *spiritus asper* (').

The Wyandot numerals, from *one* to *ten*, are as follows. The accented syllable and short vowels should be marked; the former with an accentual, the latter with a dot above.

1. s k ȯ t. 2. t ɛ n d ȋ. 3. ɾ ʂ h k. 4. n d ȁ χ k. 5. ṷ w l ɹ. 6. u w a ɹ ɓ. 7. ts ṷ t ȁ r ʕ̂ ˃ h. 8. t ɛ́ r ʕ̂ ˃ h. 9. t r o̧ ˃ h. 10. s ɛ̧ h.

Dr. Hays stated that Dr. Warren, of Boston, had given him some information in regard to recently discovered mastodons in New York and New Jersey. One of the skeletons is at Harvard College.

A complete skeleton has been disinterred at Newburgh. It has been purchased by Dr. Warren, and put together by him. It is a tetracaulodon.

Dr. Hays pointed out some marked differences between this and the skeletons of the mastodon, which he had examined.

It was moved, by Prof. Frazer, that the letter read this evening from the Historical Society of New York, be referred to a Committee, with power to take order. Mr. Kane, Dr. Ludlow, and Prof. Hare, were appointed the Committee.